

# Households' activities in informal economy: size and behavioural aspects

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# Households' Activities in Informal Economy: Size and Behavioural Aspects

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*Abstract*

Using a Romanian household survey, we analyse the structure of households' income by sources: main job, secondary job, and informal activities. We began the study by focusing on data and methodological problems, certain clarifications being necessary. Then we estimated the size of informal economy and basic behavioural regimes, along with the growth of households' disposable income. The study permitted us to conclude on the main reasons of people to operate in the informal sector. Finally, based on the available data on the households' deciles relative to their monthly income, we extended some conclusions to the year 2000 and estimated the shares of informal income within the ten groups of population. Also, by applying such methodology we computed some comparative indicators between the years 1996 and 2000.

JEL Classification: D10, D58, I32, J22, P36
Keywords: Secondary Job, Officially Declared Income, Decent Income, Hidden Income

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## 5. Behavioural regimes

In order to capture the households' behaviour, we used data from the 288-sample. According to the empirical data for 1996, the parameters of the following estimation functions were calculated:

$$Ye(X) = a / (X+b), \qquad \text{with } Ye(0) = a/b = 48.7 \cdot 10^3 \text{ Lei} \tag{5}$$

$$Ze(X) = c / [\, X + Ye(X) + d \,], \qquad \text{with } Ze(0) = bc / (a+bd) = 140.7 \cdot 10^3 \text{ Lei} \tag{6}$$

where the income from the main job, X, was used as exogenous variable and the income from the second job, Y, and the income from informal activities, Z, respectively, as endogenous variables. The coefficients a, b, c, and d were statistically estimated.

Also, we used as a constraining relation

$$He(X) = X + Ye(X) + Ze(X) \tag{7}$$

where He is the estimated total income coming from all sources (in fact this is an estimation of H*, according to the adjusted 288-sample (the asterisk was omitted here).

To compute the estimated shares of the three components of total income the following formulas were used

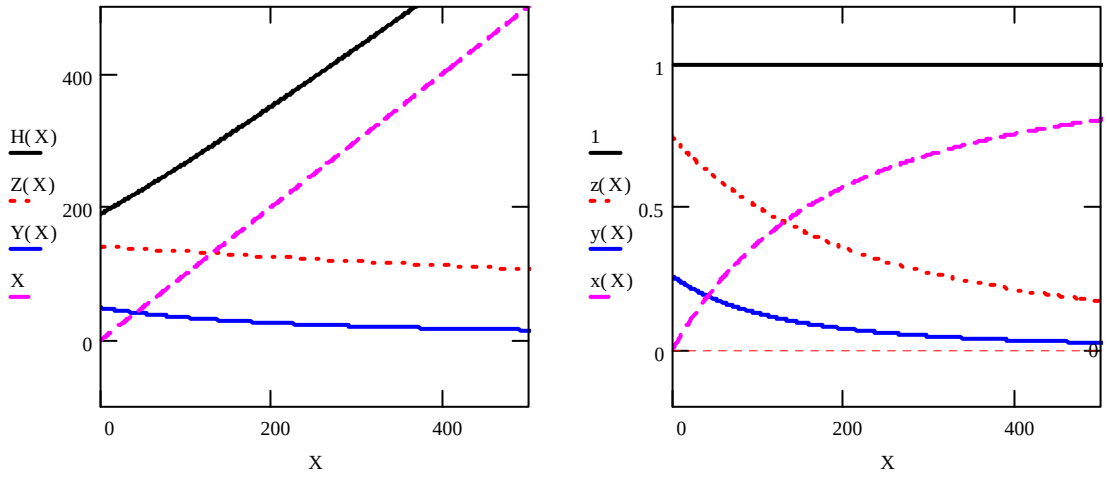
$$xe(X) = X/He(X), \qquad ye(X) = Ye(X)/He(X), \text{ and } ze(X) = Ze(X)/He(X) \tag{8}$$

where Ye, and Ze are the estimated values of the registered values of Vs and Va, respectively (as they were defined in the previous section).

Figures 4a and 4b show the general dynamic trends, in absolute terms and in relative terms, in the case of the increase of basic income's growth over time, denoted here as exogenous variable X (in figures the estimation sign "e", attached to the characters representing the variables, was omitted).

**Figure 4**

**The general representation of the income structural changes (sample-288)**




**a)** **b)**

As simulating output, there are three probable behavioural regimes, defined by the hierarchy of components in relative terms (x, y, and z are in fact the mentioned estimated shares xe, ye, and ze, but the estimation sign “e” was omitted again):

1) Transitional regime from z-y-x to z-x-y (Figure 5)
2) Transitional regime from z-x-y to x-z-y (Figure 6)
3) Stability regime x-z-y, with z and y drawing near zero (Figure 7)

**Figure 5**

**Transitional regime 1 (from the hierarchy z-y-x to z-x-y)**

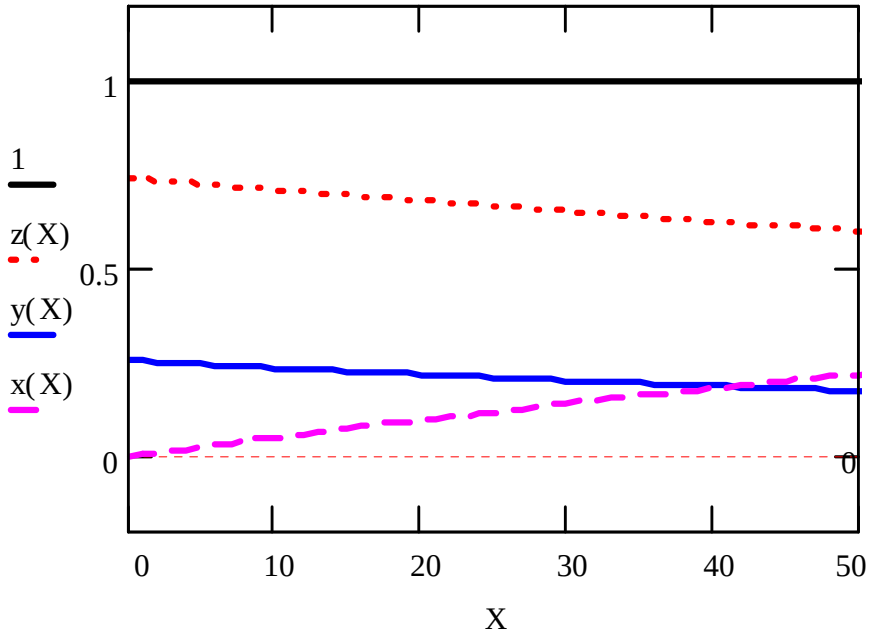



**Figure 6**

**Transitional regime 2 (from the hierarchy z-x-y to x-z-y)**

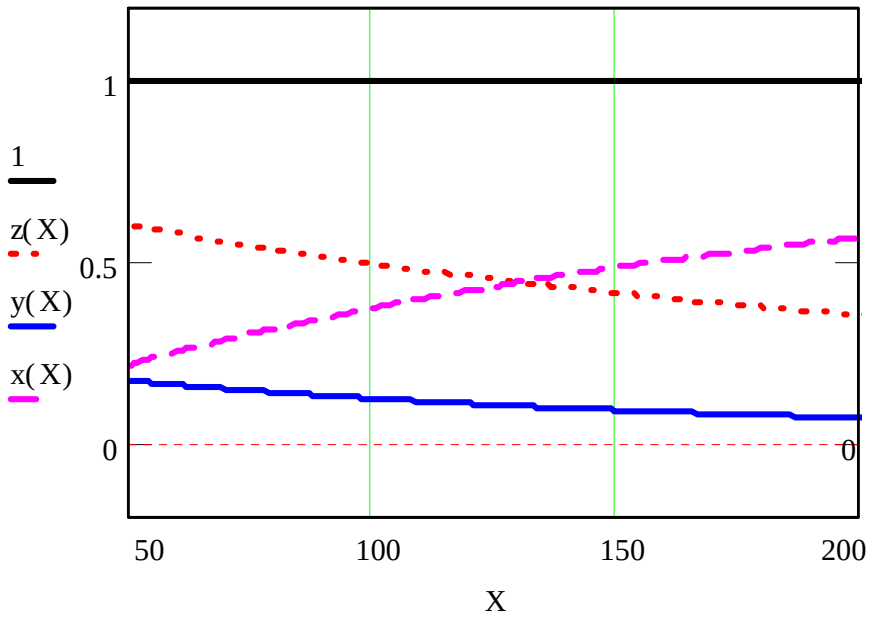
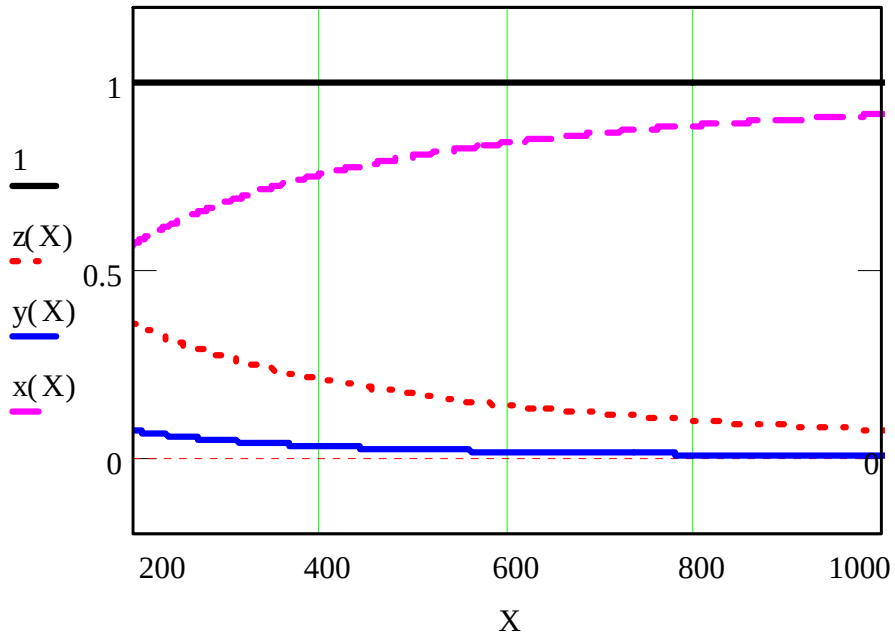


**Figure 7**

**Stability regime (x-z-y with z and y tending to near zero values)**




## 6. Extending the estimation process on the whole 2561-sample

Based on the methodology already tested in case of the reduced sub-sample of the 288 households, which declared their actual income to be equal to that desired and considered by them as being a decent income, we recalculated the data on informal income in case of the whole number of households included within the Supplementary Survey. The main idea was that in the case of people declaring their total actual income to be smaller than the desired (decent) income (households included in the group V<H*, in Table 1) there is generally an unrealistic huge level of originally estimated informal income. As we also mentioned, it could be eventually considered as a potential availability of the people to work in the informal sector, but in fact the demand of the real economy for informal activities being much smaller.

The main hypotheses and procedures that we used, in order to obtain more plausible estimation for the size of informal income, are as following:

- In case of the groups for which V=H* (288 households) and V>H* (92 households), respectively, the data on income obtained from the three sources (Vb – main job; Vs – secondary job; and Z – informal job) were conserved as they were found in the original adjusted form of the survey;

- In case of households included in the group for which V<H* (2181 households), only the data on income obtained from the two officially declared sources (Vb and Vs) were conserved;
- Conforming to the actual registered level of the official declared income, the 2181-sample was divided in two subgroups for which we used different estimation procedures: 1) households in which the average level of income per person is higher than the theoretic income estimated on the basis of the 288-sample (there are only 167 households for which V>283.7 thousand lei/person); and 2) households reporting an average level under the theoretic estimated income (there are 2014 households where V<283.7 thousand lei/person).

The estimation procedures differ as regards the two subgroups of the 2181-sample in the following way. In case of the small subgroup of 167 households (V > theoretic income), the estimated level of informal income per person is obtained by the above-described standard procedure:

$$Ze(V) = c / (V + d) \quad (9)$$

where V is the actual official declared income (V=Vb+Vs) and c, d are statistically estimated coefficients (on the basis of the 288-sample). This is a transformed form of relation (6).

In case of the huge group of the remaining 2014 households (V < theoretic income), it was supposed that informal income was placed between two extreme values, a minimum level (Zmin) and a maximum level (Zmax), respectively, which were obtained by solving, for each registered level of actual declared income (per person in household), the corresponding equations derived from a theoretic superior demand curve (TSD) and from an inferior supply curve (TIS), respectively, for informal activity:

$$\text{(TSD)} \qquad Z_{max}(V) = c / (V + d) \quad (10)$$

$$\text{(TIS)} \qquad Z_{min}(V) = m \cdot V \quad (11)$$

where m is an estimated statistically coefficient (on the base of the 288-sample).

To approach this way the changes in household's behaviour in line with its official declared income per person is equivalent to consider the existence of a certain gap between demand and supply on the labour informal market in case of poor households and no gap in case of rich households, respectively. So, denoting the theoretic average income per person and month by "vm288", there will be two distinctive areas on the informal income map (see Figure 8):

$Z(V) \in [Z_{min}(V); Z_{max}(V)]$, when $V < vm288$

and

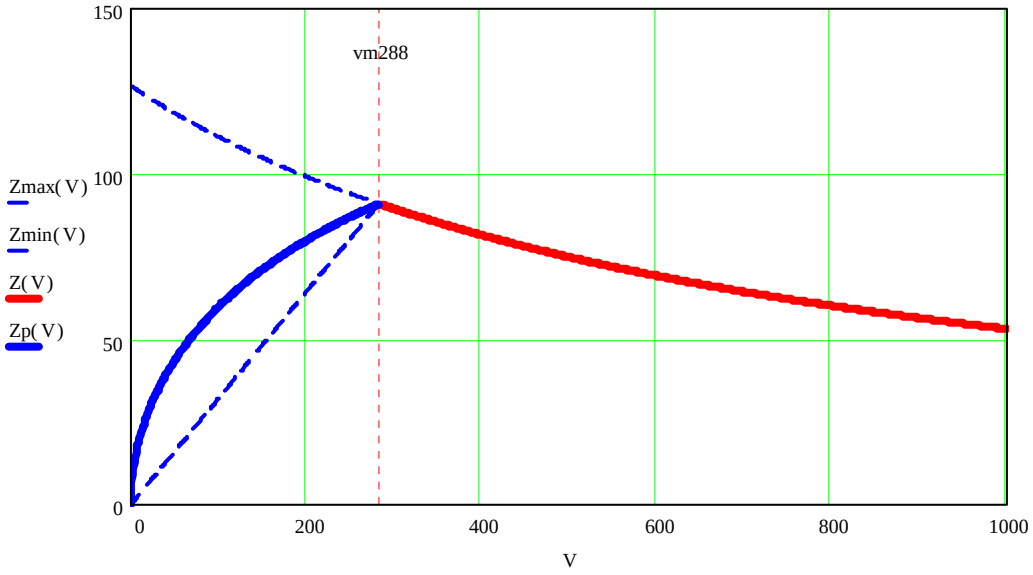
Z (V) = c / (V + d), when V > vm288, respectively.

Also, in case of poor households (V<vm288) we computed a function of most probable informal income (Zp), as a geometric average of the two above-mentioned extreme functions:

$$Zp(V) = [Zmin(V) \cdot Zmax(V)]^{1/2} = \{[c / (V + d)] \cdot (m \cdot V)\} \quad (12)$$

**Figure 8**

**Two different behavioural regimes of households in case of the 2181-sample**




Now, using the presented methodology, we are able to estimate the size of informal economy. The output of our research on the whole sample of 2561 households comprised in the Supplementary Survey is systematised in Table 3 and Table 4. The most important result is that, in the case of the whole 2561-sample, the share of informal income in total income of households was in September 1996 between 22.5-39.2% and most probably around 28.8%.

**Table 3**

**The estimated thresholds of the household informal income in 1996**

| Group of households | Number of persons | | - thou Lei per person/month - | | | |
|---|---|---|---|---|---|---|
| | | | Declared Income | Hidden Income | | |
| | Total | Average | | Zmax | Zmin | Zorig* |
| **2181 (V<H*)** | **6361** | **2.9166** | **136.5** | **107.7** | **41.4** | **231.6** |
| - 2014 (V<vm288) | 5965 | 2.9618 | 120.3 | 109.3 | 38.6 | 228.4 |
| - 167 (V>vm288) | 396 | 2.3713 | 380.6 | 83.7 | | 279.6 |
| **288 (V=H*)** | **786** | **2.7292** | **283.7** | **100.6** | | |
| **92 (V>H*)** | **293** | **3.1848** | **311.8** | **0.0** | | |
| **Total sample-2561** | **7440** | **2.9051** | **159.2** | **102.7** | **46.0** | **208.6** |

* Zorig means the originally estimated level of informal income, computed as H*-V (see Table 1), which represents the potential supply of people to work in informal sector.

**Table 4**

**The estimated structure by sources of total income of the households in 1996**

- % in total income -

| Group of households | Hidden Income | | | |
|---|---|---|---|---|
| | Zmax | Zp* | Zmin | Zorig |
| **2181 (V<H*)** | **44.1** | **31.5** | **23.3** | **62.9** |
| - 2014 (V<vm288) | 47.6 | 33.8 | 24.3 | 65.5 |
| - 167 (V>vm288) | 18.0 | | | 42.3 |
| **288 (V=H*)** | **26.2** | | | |
| **92 (V>H*)** | **0.0** | | | |
| **Total sample-2561** | **39.2** | **28.8** | **22.5** | **56.8** |

* Zp means the probable level of informal income, computed by the relation (12).

Generally, people are more incited to work in the informal sector, as the average income per person within their household is smaller. At the same time, the people's participation in informal activities is more restricted by the real demand of the economy, as they are less qualified. And often this is the situation just in the case of the poorer people. So, a vicious circle seems to emerge: poor people wish to work in informal economy but they are often restricted by a different structure of the real demand for work in the informal sector.

## 7. Extrapolating income data between 1996-2000 on the basis of Integrated Household Survey

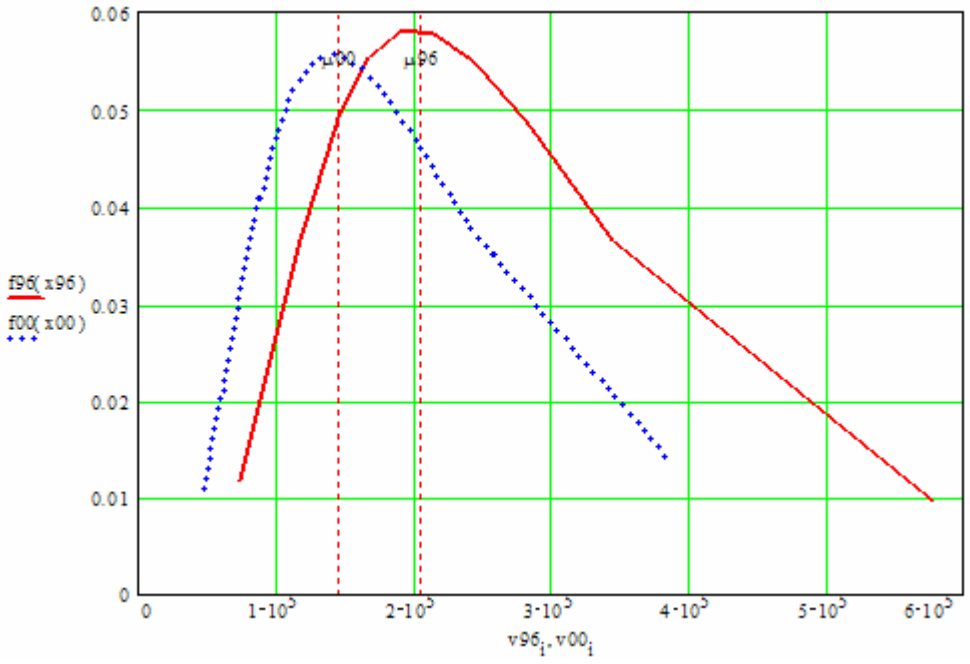
The lack of available data for the year 2000 regarding the behaviour of households on the informal labour market (as it was the case of Supplementary Survey conducted in 1996) could be partially compensated by a deeper analysis of the data yearly supplied by the

Integrated Household Survey (IHS). In order to commensurate the impact of the general level of the households' income on the rate of their participation in informal activities, it is useful to begin with the distribution of population by deciles. So, after we obtained a reasonable comparison between such distributions over the two years, we introduced the simplifying hypothesis by which the participation of people in the informal sector was mainly imposed by their standard of living or how much poor are they.

Conforming to the specialised literature and to many empirical studies, to analyse the income distribution a lognormal form is usually recommended. For Romania, we computed two distribution functions, corresponding to the years 1996 and respectively 2000 (for this year the level of households' income was transformed into 1996 constant prices), respectively, as they are graphically represented in Figure 9.

**Figure 9**

**The theoretic distribution functions for 1996 and 2000**



The function definition for the two years (denoted as “96” and “00”) are as following:

$$f96(x96) := \frac{1}{x96_i \cdot \sqrt{2 \cdot \pi} \cdot \sigma 96} \cdot e^{-\frac{1}{2} \cdot \frac{\left(x96_i - \mu\mu\, 96\right)^2}{\sigma 296}} \qquad f00(x00) := \frac{1}{x00_i \cdot \sqrt{2 \cdot \pi} \cdot \sigma 00} \cdot e^{-\frac{1}{2} \cdot \frac{\left(x00_i - \mu\mu\, 00\right)^2}{\sigma 200}} \tag{13}$$

where x means the natural logarithm of average income by person within deciles in the case of the two considered years; $\mu\mu$ – the logarithm of the average level of the declared monthly income per person, $\mu$; $\sigma$ – the variance indicator, $\sigma 296$ and $\sigma 200$, given by the relations

$$\sigma 296 := \sum_{i=1}^{N} \frac{\left(x96_i - \mu\mu\, 96\right)^2 \cdot n96_i}{\sum_{i=1}^{N} n96_i} \qquad \sigma 200 := \sum_{i=1}^{N} \frac{\left(x00_i - \mu\mu\, 00\right)^2 \cdot n00_i}{\sum_{i=1}^{N} n00_i} \tag{14}$$

with $\sigma 96 := \sqrt{\sigma 296}$ and $\sigma 96 := \sqrt{\sigma 296}$, and $n_i$ – the share of number of people in the deciles i in total of population.

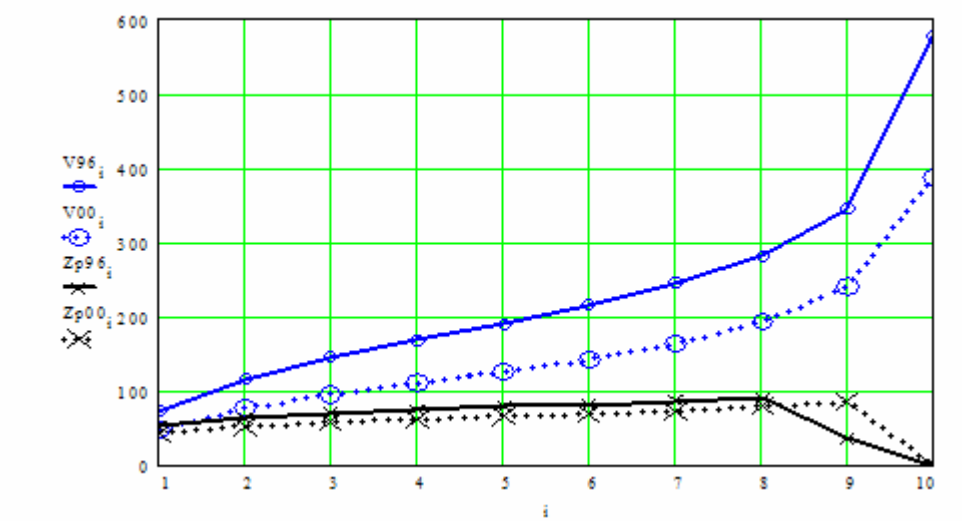
The general conclusion is that, on the background of a decrease in the amplitude of official income, a translation of distribution function to poorer households was also registered.

Considering the same level for the coefficients of the estimation equation in 2000 as in the case of sample-2561 in 1996, we computed some useful indicators that could offer some explanation about the distribution of informal income share in total income along the deciles and the households’ behaviour function in case of deciles where they were located.

For instance, Figure 10 comparatively presents, by deciles, the average income per person from formal sector (V) and that from informal sector (Zp, which means the probable level estimated by us) in 1996 (solid lines) and 2000 (doted lines).

**Figure 10**

**The average income by deciles in 1996 and 2000**




Using the same methodology as in the previous section, we estimated within deciles the thresholds for the share of informal income in the total income of households. Conforming to data presented in Table 5, as the average income per person in household decreases from D10 (576.3 thousand lei in 1996 and 387.9 thousand lei in 2000) to D1 (73.4 thousand lei in 1996 and 47.5 thousand lei in 2000), the probable share of informal income in the total budget of the household moves in a reverse way (from 0% to 41.5% in 1996 and 47.3%, respectively, in 2000). Also, Figure 11 shows a graphical representation of the correlation by deciles, in 1996 and 2000.

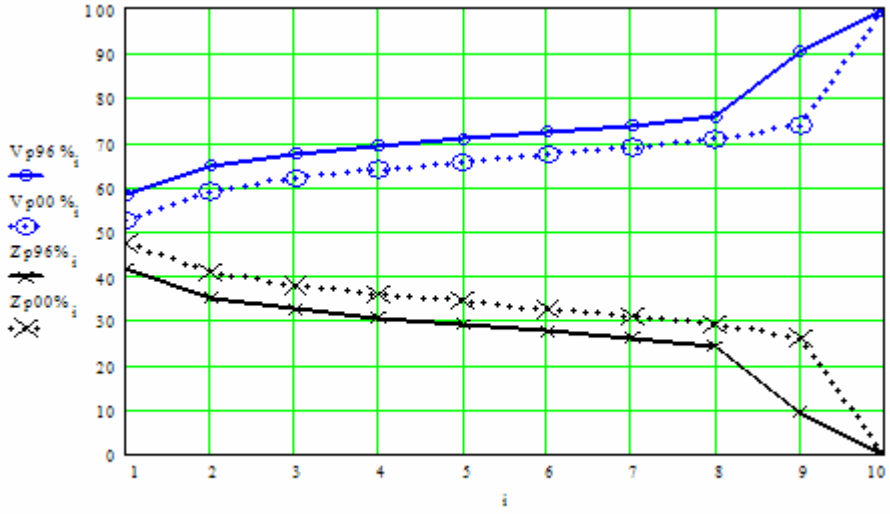
**Table 5**

**The average monthly income per person and the estimated share of informal economy within deciles in 1996 and 2000**

| Deciles | 1996 | | | 2000 | | |
|---|---|---|---|---|---|---|
| | V96 (thou Lei) | - % in total income - | | V00 (thou Lei) | - % in total income - | |
| | | V | Zp | | V | Zp |
| D1 | 73.4 | 58.5 | 41.5 | 47.5 | 52.7 | 47.3 |
| D2 | 116.6 | 64.6 | 35.4 | 76.9 | 59.1 | 40.9 |
| D3 | 144.3 | 67.4 | 32.6 | 95.2 | 61.9 | 38.1 |
| D4 | 167.4 | 69.2 | 30.8 | 110.7 | 63.9 | 36.1 |
| D5 | 191.9 | 71.0 | 29.0 | 127.0 | 65.7 | 34.3 |
| D6 | 216.1 | 72.4 | 27.6 | 143.4 | 67.3 | 32.7 |
| D7 | 244.4 | 73.9 | 26.1 | 164.5 | 69.0 | 31.0 |
| D8 | 282.3 | 75.6 | 24.4 | 192.3 | 71.0 | 29.0 |
| D9 | 344.4 | 90.5 | 9.5 | 241.1 | 73.8 | 26.2 |
| D10 | 576.3 | 100.0 | 0.0 | 387.9 | 100.0 | 0.0 |
| **Total deciles** | **205.9** | **75.9** | **24.1** | **145.5** | **71.2** | **28.8** |

**Figure 11**

**The shares of declared income and of informal income, respectively in total income, by deciles in 1996 and 2000**



Conforming to our estimation, as average in the case of the total number of households, in 1996 the informal income represented around 24.1%, but in 2000 it reached a level of about 28.8% of total income (declared and non-declared). In the case of 1996, there is a difference of 4.7 percentage points between the levels of average share of informal income (estimated as probable informal income, Vp) for the sample-2561 and for the whole number of households (conforming to IHS methodology), respectively. This could be due to a higher degree of aggregation in case of deciles reported in IHS, but we used only gross structural data and average levels by deciles, unlike the analysis of the sample-2561 where a large number of data on individual households were available. Moreover, despite some corrections operated by us (as it was a coefficient including seasonal and inflationary changes within the whole year 1996 relatively to the month of September), some other discrepancies persist (among which those referring to the structural distribution by groups of households are most important) between the sample-2561 and HIS. In case of the sample-2561 data refer only to one month, but the decile data are based on the monthly average of the whole year 1996. The threshold-values for the share of informal income at the level of the whole number of households, in 1996 and 2000, are presented in Table 6.

**Table 6**

**The average estimated share of informal economy in 1996 and 2000**

- % in total income -

| | **1996** | | | **2000** | | |
|---|---|---|---|---|---|---|
| | Zmax | Zp | Zmin | Zmax | Zp | Zmin |
| Total deciles (IIS) | **32.7** | **24.1** | **18.7** | **42.3** | **28.8** | **20.3** |
| Sample-2561 (SSHIE) | **39.2** | **28.8** | **22.5** | - | - | - |

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